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Plasma Homocysteine Levels After Acute Stroke and in the Convalescent Phase

Susanna Moskau, Alexander Semmler, Birgit Stoffel-Wagner, Michael Linnebank

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Elevated total plasma homocysteine (tHcy) levels are considered to be an independent risk factor for arteriosclerosis and stroke. Prospective studies, however, have shown no or only weak associations¹. This has raised the question whether the temporal sequence of sample collection and disease occurrence may have impacted the study results of case control studies, i.e. the timing of tHcy measurements relative to stroke onset is a factor to be considered in the interpretation of results. To collect data on the importance of the time point of plasma tHcy measurement after stroke, we compared tHcy levels of acute stroke with tHcy levels in the convalescent phase.

METHODS

We recruited patients with clinically and radiologically proven acute stroke admitted to the Department of Neurology, University of Bonn, Germany. Patients with transitory ischemic attacks or lacunar ischemic stroke were excluded from the study. Patients with concomitant diseases or medications that alter tHcy, such as renal insufficiency or multivitamin therapy, were excluded. Fasting venous blood samples were collected for determination of plasma tHcy levels within three days after stroke and during a follow-up examination after at least six months. Total plasma homocysteine was determined by fully automated particle-enhanced immunonephelometry with a BN II System (Dade Behring). The reference value for this method is 5-10 $\mu\text{mol/l}$ fasting tHcy.

Differences between the time points of homocysteine plasma level measurement were calculated with the two-sided t-test for paired samples. A p-value of ≤ 0.05 was considered statistically significant. All patients gave written informed consent. The study was approved by the local ethical committees.

RESULTS

Twenty-two patients were included in the study (47% women, average age 47.9 ± 15.2 years). Fifteen patients were diagnosed with thromboembolic ischemic stroke, four with sinus venous thrombosis and stroke, and three with intracerebral hemorrhage. The tHcy levels measured within one to three days after stroke ($12.3 \pm 3.8 \mu\text{mol/l}$) were not significantly different from tHcy levels measured during follow-up ($13.6 \pm 3.5 \mu\text{mol/l}$; $p=0.22$; Figure) for all 22 patients and when patients with sinus thrombosis and hemorrhagic stroke were excluded (not shown).

DISCUSSION

This study does not support the hypothesis that tHcy levels are different in the first three days after stroke in comparison

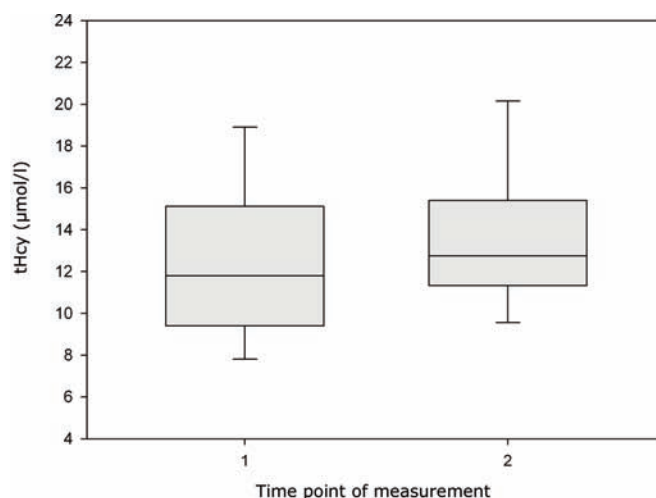


Figure: Box plot of tHcy plasma levels within the first three days after stroke (1) and during follow-up (2). The top and bottom of the box show the 25% and 75% percentile, the whiskers the 5% and 95% percentile.

with the convalescent phase. The small sample size and the heterogeneity of our sample allow for random errors and replication of these data in a different and larger population is warranted. Other studies have reported significantly lower homocysteine levels immediately after a vascular event, but rising levels during the next seven days²⁻⁴. Given the design of our study, we cannot provide information on tHcy levels of days three to seven. In summary, the present data suggest that measurement of tHcy levels can be performed within the first three days after stroke or in the convalescent phase without relevant influence of the time point of measurement.

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